

Introduction to Programming with Python

Riding the Serpent

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What is Python?



- ▶ “Invented” in 1991 by Guido van Rossum (GvR).
- ▶ An interpreted, high-level language with flexible typing.
- ▶ Currently on its third major release... in other words, very mature.

A Satisfied User

"Python has been an important part of Google since the beginning, and remains so as the system grows and evolves. Today dozens of Google engineers use Python, and we're looking for more people with skills in this language."

- Peter Norvig, Director of Search Quality at Google and Computer Science Superstar

Other Satisfied Users

- ▶ **AstraZeneca** uses Python in drug discovery pipelines.
- ▶ **Phillips'** fabrication plants are managed in Python.
- ▶ **Industrial Light & Magic** (Star Wars) employs Python for process management.
- ▶ It may be new to you, but according to TIOBE's programming languages index, Python is the sixth-most popular in the world.

What's in it for You?

All of these organizations seem to like it, why should *you* care?

Power

- ▶ Python facilitates rapid development, and comes preinstalled with a huge collection of libraries (add-on software) for pretty much anything within reason.
- ▶ There is a huge Python community and ecosystem, who will have already solved many of the problems you might encounter.

Clarity

- ▶ Python is remarkably clear and readable compared to many other languages.
- ▶ The logical flow of a program is often very intuitive, and the design philosophy

A Longstanding Tradition

```
print 'Hello World'
```

Digging In

Datatypes (1)

What are They?

- ▶ A **datatype** refers to a location in the computer's memory and the type of information stored there.
- ▶ Numbers can be of the integer datatype, like 4, or a floating-point datatype, like 4.0).
- ▶ Text is the string datatype, like "Four score and seven years ago..."
- ▶ True-false values are boolean datatypes, in Python these are `true` and `false`.

Digging In

Datatypes (2)

More Advanced Datatypes

- ▶ Obviously, more complex programs require more complex datatypes.
- ▶ The two most important in Python are lists and dictionaries.

- ▶ A list:

```
some_list = [12, 'monkeys']
```

- ▶ A dictionary:

```
some_dict = {  
    'New York': 'A state in the US.',  
    42: 'A completely irrelevant number.',  
    today_is_sunday: false  
}
```


Digging In

Methods (1)

Making Things Happen

- ▶ **Methods** are procedures that work on variables to transform or otherwise alter them.

- ▶ Change a string to all uppercase:

```
some_string = 'julius'  
some_string = some_string.upper()  
# some_string is now 'JULIUS'
```

- ▶ Access some entry (sometimes called an element) in a dictionary:

```
some_dict[42]  
# >>> 'A completely irrelevant number'
```

Digging In

Methods (2)

A Few More Examples

- ▶ Many of Python's datatypes support this sort of access (called indexing):

```
some_string[1]  
# >>> 'U'
```

- ▶ This is an important point: in Python, the first element of a collection is the “0th” one, available at `collection[0]`.
- ▶ Similarly, we can access the second element of a list with `some_list[1]`.